



National Transportation Safety Board Aviation Accident Final Report

Location:	Montgomery, TX	Accident Number:	FTW04FA025
Date & Time:	11/19/2003, 1016 CST	Registration:	N44KK
Aircraft:	Beech A45	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

While maneuvering in a simulated air-to-air combat scenario with another airplane, the accident airplane was in a climbing right turn when the right wing separated from the airframe. Subsequently, the airplane spun uncontrolled to the ground. The right wing was located approximately 1/2 mile north of the main wreckage. Examination of the separated wing revealed extensive fatigue cracking in both forward and aft wing spars. On July 9, 1999, AD 99-12-02 was issued by the FAA mandating flight and operating limitations on all Beech A45 (T-34) aircraft until structural inspection procedures could be developed. The AD prohibited operations in acrobatic and utility categories, limited the flight load from to 2.5 "G's" and limited the maximum airspeed to 175 mph. Entries in maintenance logbooks indicated that AD 99-12-02 was accomplished on June 3, 1999. A former customer of the operator had flown in the accident airplane in May, 2001, and recalled that during the flight, the instructor pilot told him that they pulled about positive 6 "G's." On August 16, 2001, the FAA issued AD 2001-13-18, which superseded AD 99-12-02, and required inspections of the wing spars for cracks per Raytheon Aircraft Company (RAC) mandatory Service Bulletin (SB) 57-3329. AD 2001-13-18 allowed the operator an alternative method of compliance (AMOC) or an adjustment to the compliance time if the method provides an "equivalent level of safety" to the AD. On November 13, 2001, the airplane underwent a 100-hour inspection at which time log entries indicated that paragraphs d(1), d(2), and d(3) of AD 2001-13-18 were complied with and that paragraphs d(5), d(6), and d(7) were complied with by August 2002. On August 26, 2002, at an aircraft total time of 8,031.4 hours, compliance with the remaining provisions of AD 2001-13-18, through the use of an AMOC, began with inspections of the rear spar bathtub fittings per the T-34 Technical Committee Report. No discrepancies were noted at this time. On December 16, 2002, the FAA issued a revised Special Airworthiness Information Bulletin (SAIB) number CE-02-38R2 to advise all operators to the available AMOCs for compliance with AD 2001-13-18. The aircraft then underwent two subsequent 100-hour inspections and an annual inspection with no work noted related to the AMOC. On November 5, 2003, the aircraft underwent a 100-hour inspection and entries in the logbook indicated that the mechanic called the FAA Aircraft Certification Office (ACO) in Wichita, Kansas, and inquired about a possible time extension to comply with AD and AMOC requirements. According to the logbook entry, the representative from the ACO informed the mechanic that "as long as the

rear spar inspection was complied with that the aircraft could continue to fly but the limitations specified in AD 99-12-02 would remain until AMOC completed." In a written statement, the representative from the ACO stated that he received a telephone call concerning the T-34 wing AD and SAIB, regarding certain AMOC's. He reported that the operator informed him "that the aircraft was coming up on the two hundred hour limit specified in the SAIB and that the aircraft would be grounded because the replacement spar was not yet installed. The operator wanted to know what could be done to continue flying." The ACO representative further stated that he informed the operator to "perform the inspections required by the AD. This would permit the aircraft to continue flying until the mod could be completed." On November 5, 2003, the rear bathtub fitting inspection was again performed with no discrepancies noted, 220.5 hours since the first bathtub fitting inspection. No documentation of a scheduled AMOC modification was found in the aircraft logbook. According to available records, the aircraft had not completed any AMOC or the Raytheon Service Bulletin. The lower wing bathtub fitting had been inspected allowing operation beyond the 80-hour limit with restrictions, about 2 weeks prior to the accident. On March 15, 2004, the FAA published AD2001-13-18 R1, which rescinded all previously approved AMOC's for the T-34 wing. The new AD also grounded any T-34 that had not accomplished the Raytheon Service Bulletin, and had flown more than 80 hours since August 16, 2001. The FAA determined that the AMOC's listed in AD 2001-13-18 did not address all critical areas in the wing spar assembly, and should no longer be valid.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The non-compliance with applicable Airworthiness Directives which required wing spar inspections, and the continued operation of the aircraft beyond the compliance time extension granted as per the approved alternate means of compliance (AMOC). Also causal was the operation of the aircraft outside of its flight "G" load limitations. Contributing factors were the misunderstanding between the Federal Aviation Administration (FAA) ACO and maintenance personnel in regard to AD/AMOC compliance, the insufficient AMOC's, and failure of the operator to adequately comply with CFR Part 91 subpart E, maintenance.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION

Phase of Operation: MANEUVERING

Findings

1. (C) WING,SPAR - FAILURE,TOTAL
2. (C) WING,SPAR - FATIGUE
3. (C) MAINTENANCE,COMPLIANCE WITH AD - NOT COMPLIED WITH - COMPANY/OPERATOR MANAGEMENT
4. (C) IMPROPER USE OF EQUIPMENT/AIRCRAFT - COMPANY/OPERATOR MANAGEMENT
5. (F) INSUFFICIENT STANDARDS/REQUIREMENTS - FAA(ORGANIZATION)
6. (F) PROCEDURES/DIRECTIVES - NOT UNDERSTOOD - OTHER MAINTENANCE PERSONNEL
7. (F) INFORMATION INSUFFICIENT - FAA(OTHER/ORGANIZATION)

Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: MANEUVERING

Findings

8. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

9. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On November 19, 2003, at 1016 central standard time, a Beech A45 single-engine airplane, N44KK, registered to PRVNY PLUK, LLC, of Houston, Texas, and operated by Texas Air Aces of Spring, Texas, was destroyed when it impacted terrain following a loss of control after an in-flight breakup while maneuvering near Montgomery, Texas. The commercial pilot and pilot-rated passenger were fatally injured. Visual meteorological conditions prevailed, and a flight plan was not filed for the 14 Code of Federal Regulations Part 91 training flight. The local flight originated from the David Wayne Hooks Memorial Airport (DWH), near Spring, Texas, approximately 0930, in the flight lead position of a flight of two airplanes.

The pilot-rated passenger attended Texas Air Aces for a two-day advanced maneuvering program (AMP), which included ground school and in-flight training that focused on unusual attitude recognition and "upset" recovery. On the morning of the accident, a pre-flight briefing was conducted by the pilot in command of the accident airplane. According to the pilot-rated passenger of the second airplane in the formation (N141SW): "The briefing included the pertinent radio and formation information for a flight of two, to and from the practice area. Loss of radio was covered. We discussed completing the AMP training from the day before. The pre-flight brief did not include air combat maneuvers, as I remember it."

According to a statement provided by the pilot of N141SW, the flight of two airplanes flew to a practice area located near Lake Conroe, approximately 15 miles north northwest of DWH. The formation flight split up upon arriving at the practice area and conducted individual upset maneuver training. After the training was completed, approximately 1010, the pilot in command of N141SW suggested to the flight leader (pilot of N44KK) that they engage in a simulated air combat demonstration. The flight leader agreed, and both airplanes rendezvoused over Lake Conroe for a "standard engagement." The pilot-in-command of N141SW stated they initially "engaged" at 7,500 feet and 140 knots. Each aircraft made a left climbing turn to begin the maneuvering. Several turns were made as the airspeed continually decreased. After two or three turns, the flight lead aircraft (N44KK) was below and to the right (4-5 o'clock position) of the second aircraft (N141SW) when it "broke up in flight and spun to the ground."

The pilot in command of N141SW squawked transponder code "seventy seven hundred" (7700) and made a "Mayday" call on VHF frequency 121.50. N141SW continued to fly over the accident site for approximately 10-15 minutes before returning to DWH. The wreckage of N44KK came to rest in a heavily wooded area, and flames were observed by the pilots of N141SW.

A witness, located .52 nautical miles south southeast of the impact point, was outside in her yard and observed the airplanes flying overhead for approximately 45 minutes. She reported that she heard two "popping noises, then a clack," like armor hitting each other, then another "pop." The engine went silent, and in the distance she heard a "pop," then a sound like a "dud fire cracker." The witness heard a whirling sound, looked up and saw a wing floating down at an approximate a 65-degree angle. She stated that she did not see the wing come off of the airplane, but observed smoke and ash flying in the air. The right wing came to rest

approximately 235 feet from where the witness was located.

Several other witnesses on the ground observed both airplanes maneuvering overhead. One witness stated that both airplanes were in a "bank maneuver," when one of the airplane's "wings came off and began to spiral down." Another witness reported that they heard the engine "revving real high, full throttle," and stated that there was no collision between the two airplanes.

PERSONNEL INFORMATION

The pilot-in-command, who occupied the rear seat, was a co-founder of Texas Air Aces and had been an employee since 1992. He held a commercial pilot certificate with airplane single-engine land, airplane multi-engine land, and instrument airplane ratings. He also held a flight instructors certificate. The pilot was issued his most recent Federal Aviation Administration (FAA) second-class medical certificate on November 11, 2003, with a limitation requiring the holder to wear corrective lenses. At the time of the pilot's most recent medical certificate application, he reported a total of 15,100 flight hours. The pilot's logbooks were not recovered.

The pilot-rated passenger, who occupied the front seat, held an airline transport certificate with type ratings in the DC-9 and DO-328, a commercial pilot certificate with an airplane single-engine land rating, and a flight engineer certificate. He also held a flight instructors certificate. He was issued his most recent FAA first-class medical certificate on October 6, 2003, with a limitation requiring the holder to wear corrective lenses. At the time of his last medical application, he reported a total of 5,650 flight hours.

AIRCRAFT INFORMATION

The 1965-model Beech A45 single-engine airplane, serial number G-714 was a low wing, semi-monocoque design airframe, configured for a maximum of two occupants in a tandem seating configuration. Originally, the primary function of the aircraft was a primary military trainer. Many of these military trainers, when de-commissioned by the military, were bought, refurbished, and utilized in the civil aviation community. According to the airplane operating handbook, the airplane (when manufactured) was capable of gravity (g) loading limits from +6g to -3g. The airplane was powered by a Continental IO-520-BB engine, rated at 285-horsepower, driving a three bladed constant speed Hartzell propeller.

On July 9, 1999, Airworthiness Directive (AD) 99-12-02 was issued by the FAA. The AD mandated flight and operating limitations on all Beech A45 aircraft until structural inspection procedures could be developed. The AD limited the aircraft to normal category operations and prohibited operations in acrobatic and utility categories. Additionally, the AD limited the flight load factor from "0" to "2.5" G's and limited the maximum airspeed to 175 miles per hour (mph).

On August 16, 2001, the FAA issued AD 2001-13-18, which superseded AD 99-12-02, and was applicable to all Beech A45 aircraft. AD 2001-13-18 maintained the actions required in AD 99-12-02 (paragraphs d(1), d(2), d(3), and d(4)) until such time as the inspection required in paragraph d(5) is accomplished as summarized below.

d(1) Install placards on the airplane instrument panels (both front and back) next to the airspeed indicators in the pilot's clear view: "Never exceed speed, VNE 175 mph (152 knots) IAS; Normal Acceleration (G) Limits 0, and +2.5; ACROBATIC MANEUVERS PROHIBITED." Insert this AD into the aircraft flight manual (AFM). Required prior to further flight after July

9, 1999.

d(2) Mark the airspeed indicator with a red radial line at 175 mph and a white slippage index mark. Required within 10 hours time in service (TIS) after July 9, 1999.

d(3) Mark the "g" meters with red lines at 0 and +2.5 and a white slippage index mark. Required within 10 hours TIS after July 9, 1999.

d(4) The actions indicated in d(1-3) above are no longer required after the initial inspection in d(5)

d(5) Inspect the wing spars for cracks per Raytheon Aircraft Company (RAC) mandatory Service Bulletin (SB) 57-3329. Required within the next 80 hours TIS after August 16, 2001, or within 12 months after August 16, 2001, whichever is later. Inspect thereafter at intervals not to exceed 80 hours TIS.

d(6) Replace any cracked wing spar found in d(5) prior to further flight. A crack indication in the filler strip is allowed if the crack direction is toward the outside edge of the part.

d(7) Submit a report to the FAA with the initial inspection results even if no crack is found in accordance with pages 58 through 60 of RAC SB 57-3329. Required within 10 days after the initial inspection or within 10 days after August 16, 2001, whichever is later.

In February of 2000, Raytheon issued SB 57-3329, requiring the following inspections on the wings.

1. Per step 8, inspect, using an eddy current probe, nine fastener holes in the forward spar (4 oriented vertically through the spar cap and the outboard end of the wing fitting and 5 oriented horizontally through the lower spar structure.)

2. Per step 8, inspect, using an eddy current probe, the forward and aft edge of the forward hinge extrusion adjacent to both the leading edge lower skin and the box section lower skin, along the entire length of the spar.

3. Per step 9, inspect, using an eddy current probe, one fastener hole in the forward main landing gear (MLG) trunnion fitting and 2 fastener holes in the aft MLG trunnion fitting.

4. Per step 10, inspect using an eddy current probe, two fastener holes in the box section lower, forward hinge and adjacent to two fasteners in the leading edge lower hinge angle.

5. Per step 11, inspect, using an eddy current probe, the lower surface of the lower, aft, outboard bathtub fitting.

6. Per step 12, inspect, using an eddy current probe, the lower aft reinforcement on the inboard and outboard side of the vertical stiffener on the aft side of the forward spar.

7. Per step 13, inspect visually the upper and lower spar caps, adjacent hinge angles, the forward side of the forward spar, the aft side of the forward spar, and the forward side of the aft spar for corrosion.

The area is then rebuilt with removable fasteners and a small access panel to facilitate future inspections, which are required every 80 hours TIS.

In section (e) of AD 2001-13-18, the FAA allows the operator of the aircraft an alternative method of compliance (AMOC) or an adjustment to the compliance time if the method provides an "equivalent level of safety" to the AD.

On December 16, 2002, the FAA issued a revised Special Airworthiness Information Bulletin (SAIB) number CE-02-38E2 to advise all owners of Beech A45 aircraft to the available AMOCs for compliance with AD 2001-13-18. As stated in the SAIB, in order to use an AMOC for compliance with AD 2001-13-18, the owner must accomplish the following:

1. The operational limitations specified in d(1-3) of the AD remain in effect until the aircraft has been modified by an approved structural AMOC.
2. Within 20 hours TIS after August 16, 2002, accomplish the rear spar attach (bathtub) fitting inspection per the T-34 Technical Committee Report number 071102, Part 1, Revision IR, Appendix A. This report outlines a fluorescent penetrant and eddy current inspection of the rear spar bathtub fitting. If cracks are found, notify the Wichita ACO and no further flight is permitted without replacement of the forward wing spar and rear spar bathtub fitting.
3. Repeat the rear spar fitting inspection within 100 hours TIS.
4. The aircraft owner must obtain and retain proof that they are scheduled for an approved structural modification within 100 hours TIS from August 16, 2001, or within 20 hours TIS August 16, 2002, whichever is later. Proof of the scheduled maintenance should be in hand no later than August 16, 2003.
5. The structural AMOC modification must be completed by August 16, 2004, or 200 hours TIS after the first rear spar inspection, whichever occurs first.
6. The aircraft owner must provide the bathtub fitting inspection results to the modifier selected for the modification that will then maintain this information and provide it to the FAA.
7. Modifiers holding approved AMOCs must share their schedule and records of modifications with the FAA.

Review of the aircraft maintenance logbooks were accomplished by the NTSB and FAA. Entries in the records showed that the airplane had accumulated 8,257.4 hours of total airframe time as of the time of the accident. The last 100-hour inspection was conducted on November 5, 2003, at an airframe total time of 8,251.9 hours and engine total time of 2,513.7 hours (676.6 hours since major engine overhaul). The last annual inspection was conducted on July 3, 2003, at an airframe total time of 8,157.4 hours.

According to the logbook entries, in February of 1999, the left wing inboard, upper, and lower trailing edge skins along with the two left wing rear spar inboard, lower angles, and the lower spar cap were replaced. On June 3, 1999, AD 99-12-02 was accomplished. In October of 2000, the airplane's wings were removed and disassembled. According to the logbook, at this time, the left and right wing leading edge, upper, inboard hinges halves, and all hinge pins were replaced. According to a FAA form 337 found in the records, only the left wing hinge halves and pins were replaced. On November 13, 2001, the airplane underwent a 100-hour inspection at which time entries were made stating that AD 2001-13-18 was accomplished. A note within the logbook entry stated that paragraphs d(5-7) of AD 2001-13-18 are to be complied with by August of 2002.

On August 26, 2002, at an aircraft total time of 8,031.4 hours, compliance with AD 2001-13-18, through the use of an AMOC, began with the eddy current and fluorescent particle inspection of the rear spar bathtub fittings per the T-34 Technical Committee Report. No discrepancies were noted at this time. The aircraft underwent two subsequent 100-hour inspections on

December 2, 2002, and July 3, 2003, and an annual inspection on July 3, 2003, with no work noted relating to the AMOC.

Logbook entries indicated that the aircraft underwent a 100-hour inspection on October 23, 2003. In a written statement, the company performing the inspection advised Texas Air Aces that the rear spar inspection was over due and the aircraft exceeded the allowable time given for the AMOC. The company representative stated that he then called the FAA Aircraft Certification Office (ACO) in Wichita, Kansas, and inquired about a possible time extension. The representative from the ACO informed the company representative that "as long as the rear spar inspection was complied with and that the aircraft was on a waiting list for the AMOC, it would satisfy the requirements of the AD and AMOC."

In a written statement, the representative from the ACO stated that he received a telephone call concerning the T-34 wing AD and SAIB, regarding certain AMOCs. He reported that the operator informed him "that the aircraft was coming up on the 200 hour limit specified in the SAIB and that the aircraft would be grounded because the replacement spar was not yet installed. The operator wanted to know what could be done to continue flying." The ACO representative further stated that he informed the operator to "perform the inspections required by the AD. This would permit the aircraft to continue flying until the modification could be completed."

On November 5, 2003, the rear bathtub fitting inspection was again performed with no discrepancies noted at an aircraft total time of 8,251.9 hours, 220.5 hours since the first bathtub fitting inspection.

No proof of a scheduled AMOC modification was found in the aircraft logbook. A mechanic provided a copy of a printed check dated August 12, 2003. Information provided from the T-34 Spar Corporation indicated N44KK was scheduled to receive the AMOC modification around November 12, 2003, but the Texas Air Aces brought a different aircraft to the modification facility instead. In addition, the T-34 Spar Corporation stated that they did not received the bathtub fitting inspection results as required by the AMOC.

In a written statement provided to the NTSB investigator-in-charge, a former customer of Texas Air Aces reported that he had previously flown the accident aircraft in May of 2001. He stated that during the flights, he was sitting in the front seat and didn't notice any type of "G" meter installed. During the flight, the instructor pilot was "chasing the other airplane" and "pulled a significant number of G's." After the completion of the flight, the former customer asked the instructor pilot how many "G's" were pulled and recalled the answer was about positive 6 "G's."

METEOROLOGICAL INFORMATION

The automated surface observing system at the Montgomery County Airport (CXO), near Conroe, Texas, located approximately 17 nautical miles southeast of the accident site, reported at 0953, wind from 320 degrees at 9 knots, visibility 10 statute miles, few clouds at 9,000 feet, temperature 62 degrees Fahrenheit, dew point 37 degrees Fahrenheit, and an altimeter setting of 30.26 inches of Mercury. The investigator-in-charge (IIC) calculated the density altitude to be approximately 234 feet.

WRECKAGE AND IMPACT INFORMATION

Evidence at the heavily wooded accident site showed that the aircraft impacted the ground in a

near vertical attitude, with the wreckage debris scattered on a general 215-degree magnetic heading. Global Positioning System (GPS) coordinates were, Latitude 30 degrees 27 minutes North and Longitude 095 degrees 39 minutes West, at an elevation of 251 feet. The left wing, left horizontal stabilizer, left elevator, and left aileron were located within the main wreckage crater, and exhibited extensive crushing and post-impact fire damage. The cockpit and cabin were crushed and fragmented. The engine was embedded approximately four feet into the ground. The vertical stabilizer, right horizontal stabilizer, rudder, right elevator, right elevator counter weight, portions of the tail cone, plexi-glass, and engine cowling were located within a 300 foot radius of the main wreckage. The right wing was located .52 nautical miles from the main wreckage, on a magnetic heading of 172-degrees from the main wreckage. The right main landing gear was located .29 nautical miles, on a magnetic heading of 170-degrees from the main wreckage site. The canopy shroud and frame fragments were located .16 nautical miles, on a magnetic heading of 180-degrees from the main wreckage.

Detailed examination of the right wing was accomplished under the supervision of the NTSB at the facility of Air Salvage of Dallas, near Lancaster, Texas, on November 26, 2003. [See Structures Group Report for additional detail and diagrams]

The forward spar was fractured at Flight Station (FS) 34 and the rear spar fractured at FS 66. The wing's entire leading edge was attached to the forward spar of the wing. Between the forward spar and the trailing edge, the upper wing surface separated along the outboard edge of the main wheel well. The outboard flap rail was deformed inboard and the inboard flap rail was not present. The aileron was still attached to the wing with minor damage to the aft, inboard corner of the trim tab. The wingtip and outboard leading edge in the vicinity of FS 168 had crush damage in a downward direction. The lower wing skin had two punctures near FS 84. The lower leading edge was separated circumferentially from the forward spar around to about 1/3 the length along the upper surface at the production break at FS 40. The lower flap fairings were torn and crushed.

The upper portion of the leading edge forward of the forward spar was buckled rearward and scratch marks were present on the inboard leading edge from inboard to outboard. The upper wing skin was missing from FS 23 to the splice line at FS 107, with the exception of a small piece of skin about 5 inches wide between FS 80 and FS 107. Grayish marks and red scrapes were present on the surface of this small section of skin. The rib at the outboard edge of the landing gear well (FS 66) was buckled inboard about 4 inches up from bottom and torn about 5 inches forward of the rear spar. The rib at FS 80 was buckled outboard about 4 inches up from bottom and the upper aft corner was missing. The FS 94 rib was buckled outboard about 6 inches above the bottom. All of the cable routing holes in the four ribs were torn aft and upward, and the upper skin fasteners were pulled out in an upward direction. Buckling was evident in the upper skin from FS 108 to FS 191 diagonally between the stringers.

Examination of the forward spar revealed that the lower hinge extrusion, filler strip, forward J channel, aft J channel, forward reinforcement, and aft reinforcement fractured at FS 34. The filler strip remained intact up to its production break, and the upper hinge extrusion fractured at about FS 31.

Examination of the aft spar revealed that the upper forward angle, upper aft angle and spar web were fractured at FS 66. The lower forward angle, lower aft angle, and spar cap were fractured at FS 65.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy on the pilot in command was performed by the Harris County Medical Examiner, of Houston, Texas.

Toxicology tests were performed by the FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. Nordiazepam was detected in the pilot in command's lung and kidney. According to the FAA's Regional Flight Surgeon, Nordiazepam is a metabolite of the anti-anxiety agent, Valium. Use of this medication could have precluded medical certification of this pilot had it been reported. The pilot would have been warned not to fly while taking the medication. Review of past applications showed that this airman failed to report this medication to the Flight Surgeon.

TESTS AND RESEARCH

On December 24, 2003, the NTSB Materials Laboratory, in Washington, D.C., examined the inboard and outboard sections of the forward and rear spar of the right wing. [See Materials Laboratory Report for detail]

Visual examination of the upper spar cap portion of the forward spar fracture revealed that the fractures had a uniform clean matte gray appearance and were oriented on a slant plan, typical of overstress fracture. At the fracture location, the spar cap elements consisted of the hinge extrusion, the filler strip, the forward J-channel, the aft J-channel, the forward reinforcement, and the aft reinforcement. The forward spar web piece on the outboard portion of the spar was fractured around a rivet hole near the lower spar cap. The filler strip, the hinge extrusion, and the forward J-channel all fractured through the outboard two rivet holes for the lower wing fitting.

The outboard portion of the forward spar fracture had also contained the outboard tang of the lower wing fitting. This tang had been assembled between the upper side of the filler strip and the lower edges of the J-channels. This tang piece was not recovered. Although the inboard portion of the forward spar fracture area was submitted, the lower portion of the lower wing fitting was also missing from this piece of the wing. The fracture at the lower spar was through the most outboard rivet holes for the wing fitting. Visual and scanning electron microscopy revealed that a total of 17 fatigue crack regions were present in the lower spar cap structural elements prior to the final fracture.

Visual examination of the upper spar cap aft spar fracture areas revealed that the fractures had a uniform clean matte gray appearance and were oriented on a slant plane, typical of overstress fracture. The rear spar lower cap fracture was just inboard of the outboard wheel well rib at a location approximately in line with the web splice at wing station 66. The lower cap fracture was through the outboard fastener hole common to the lower leg of the aft trunnion fitting, which was assembled to the front side of the spar web. At the fracture location, the spar cap elements consisted of post-fracture mechanical damage, but the inboard face was undamaged. The inboard face of the fracture was examined optically with a scanning electron microscope, and 4 fatigue crack regions were found.

ADDITIONAL INFORMATION

An accident, involving an A45 aircraft in mock aerial combat, had occurred on April 9, 1999. N44KK and the previous accident aircraft were both operated by Simulated Air Combat / Upset Training Part 91 operators for approximately 9-10 years. The previous accident aircraft had

approximately 4,000 hours operation in this environment, and N44KK had about 5,000 of operation. Both aircraft had pre-existing fatigue cracks at the points of separation, and their respective wings had separated at the same location (the 1999 accident aircraft had an additional separation point at the lower wing attach fitting).

N44KK had not completed any Alternate Method of Compliance (AMOC) or the Raytheon Service Bulletin, but was scheduled for the "doubler plate" AMOC. It had been inspected per SAIB CEO2-38R2 (Flourescent Dye Penetrant method) to inspect the rear lower wing attach fittings, which allows operation beyond the 80-hour limit with restrictions, about 2 weeks prior to the accident.

It was not possible to determine whether N44KK flew beyond "G" limitations on the day of the accident. The aircraft's video recorder, and "G" meter were destroyed by a post-impact fire. However, a pilot who flew in N44KK on May 2, 2001, reported in a written statement that he remembers the instructor pilot telling him that they had pulled "something over six-G's" during the flight.

On March 15, 2004, the FAA published AD2001-13-18 R1, which recinded all previously approved AMOC's for the T-34 wing. The new AD also grounded any T-34 that had not accomplished the Raytheon Service Bulletin, and had flown more than 80 hours since August 16, 2001. The FAA determined the new AD that the AMOC's listed in AD 2001-13-18 did not address all critical areas in the wing spar assembly, and should no longer be valid.

Flight Instructor Information

Certificate:	Flight Instructor; Commercial	Age:	64, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Rear
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	11/11/2003
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	15100 hours (Total, all aircraft)		

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial; Flight Engineer	Age:	39, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	10/06/2003
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	5650 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N44KK
Model/Series:	A45	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Aerobatic	Serial Number:	G-714
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	11/05/2003, 100 Hour	Certified Max Gross Wt.:	2950 lbs
Time Since Last Inspection:	5.5 Hours	Engines:	1 Reciprocating
Airframe Total Time:	8257.4 Hours at time of accident	Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	IO-520-BB
Registered Owner:	PRVNY PLUK, LLC	Rated Power:	285 hp
Operator:	Texas Air Aces	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	CXO, 246 ft msl	Distance from Accident Site:	17 Nautical Miles
Observation Time:	0953 CST	Direction from Accident Site:	120°
Lowest Cloud Condition:	Few / 9000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	9 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	320°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.26 inches Hg	Temperature/Dew Point:	17° C / 3° C
Precipitation and Obscuration:			
Departure Point:	Spring, TX (DWH)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	0930 CST	Type of Airspace:	Class E

Airport Information

Airport:	Montgomery County Airport (CXO)	Runway Surface Type:	Unknown
Airport Elevation:	246 ft	Runway Surface Condition:	Unknown
Runway Used:	NA	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	30.455278, -95.663333

Administrative Information

Investigator In Charge (IIC):	Alexander Lemishko	Report Date:	03/30/2005
Additional Participating Persons:	Robert J Loomis; Flight Standards District Office; Houston, TX Eddie Webber; Raytheon Aircraft Company; Wichita, KS Victor Juarez; T-34 Association; Las Vegas, NV		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).